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# (12) United States Patent

# Hoellwarth

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# (54) HEAD-MOUNTED DISPLAY APPARATUS FOR RETAINING A PORTABLE ELECTRONIC DEVICE WITH DISPLAY

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(\*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

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This patent is subject to a terminal dis-

claimer.

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# Related U.S. Application Data

- (60) Continuation of application No. 16/418,906, filed on May 21, 2019, now Pat. No. 10,530,915, which is a (Continued)
- (51) Int. Cl. #04M 1/05 (2006.01) G06F 3/01 (2006.01) (Continued)
- (58) Field of Classification Search CPC .. H04M 1/05; H04M 1/0266; H04M 1/72569; H04W 4/80; A45F 5/00;

(Continued)

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### (57) ABSTRACT

Head-mounted display systems and methods of operation that allow users to couple and decouple a portable electronic device such as a handheld portable electronic device with a separate head-mounted device (e.g., temporarily integrates the separate devices into a single unit) are disclosed. The portable electronic may be physically coupled to the head-mounted device such that the portable electronic device can be worn on the user's head. The portable electronic device may be operatively coupled to the head-mounted device such that the portable electronic device such that the portable electronic device and head mounted device can communicate and operate with one another. Each device may be allowed to extend its features and/or services to the other device for the purpose of enhancing, increasing and/or eliminating redundant functions between the head-mounted device and the portable electronic device.

# 20 Claims, 25 Drawing Sheets

